

Q1: (10 Marks).

- (a)- Explain with drawing the following items: (1)- The PCM modulation technique. (2)- Low-pass-filter and its cutoff frequency. (3)- Sampler, quantizer, and encoder. (4)- Sampling theory and the optimal sampling frequency. (4 Marks).
(b)- For the circuit shown in Figure (1) what are the objective of the following components: U1:A, U1:B, R₁, R₂, R₃, R₄, R₅, R₆, C₁, and C₂. (3 Marks).

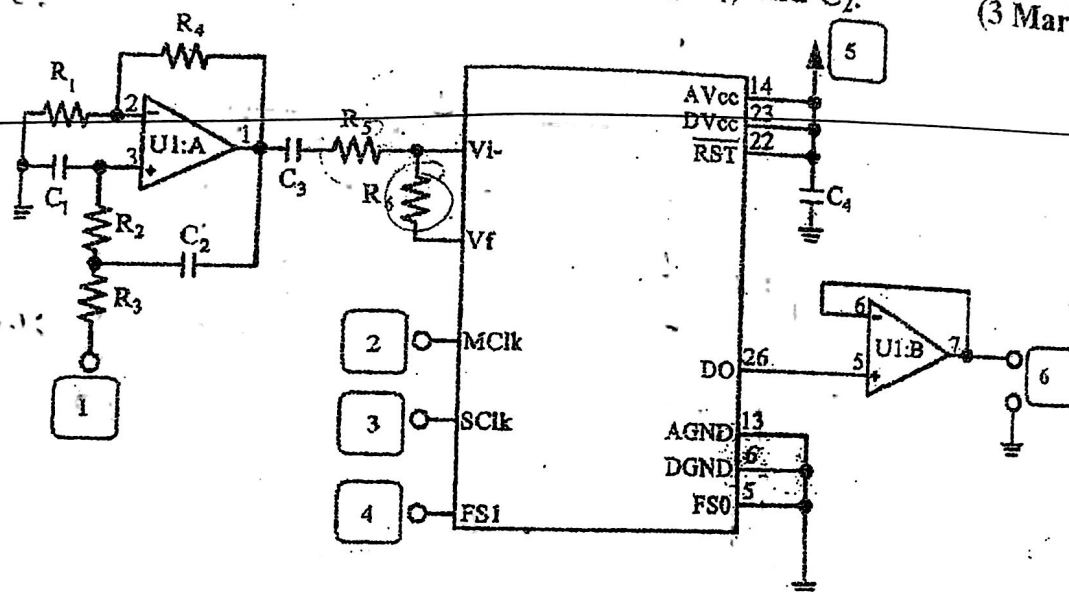


Figure (1)

- (c)- For the circuit shown in Figure (1), write a name and explain the function of each numbered point. (3 Marks).

Q2: (10 Marks).

- (a)- Explain with drawing the following items:
(1)- The block diagram of the PCM demodulation technique. (2)- The basic block diagram of ASK modulation technique. (3)- The basic circuit diagram of the ASK modulator by using 2206 IC. (6 Marks).
(b)- For the circuit shown on Figure (2), name this circuit and explain its function. For each component shown in Figure (2), explain its function and write the name of each numbered point. (4 Marks).

Q3: 10 Marks.

- (a)- Explain with drawing the following items:
(1)- The block diagram of the asynchronous ASK demodulator.
(2)- The structure diagram of the FSK modulator.
(3)- The circuit diagram of FSK modulator by using 2206 IC. Write the equations of f_1 , and f_2 . (6 Marks).

- (b)-For the circuit shown on **Figure (3)**, name this circuit and explain its function. For each component shown in **Figure (3)**, explain its function and write the name of each numbered point. (4 Marks).

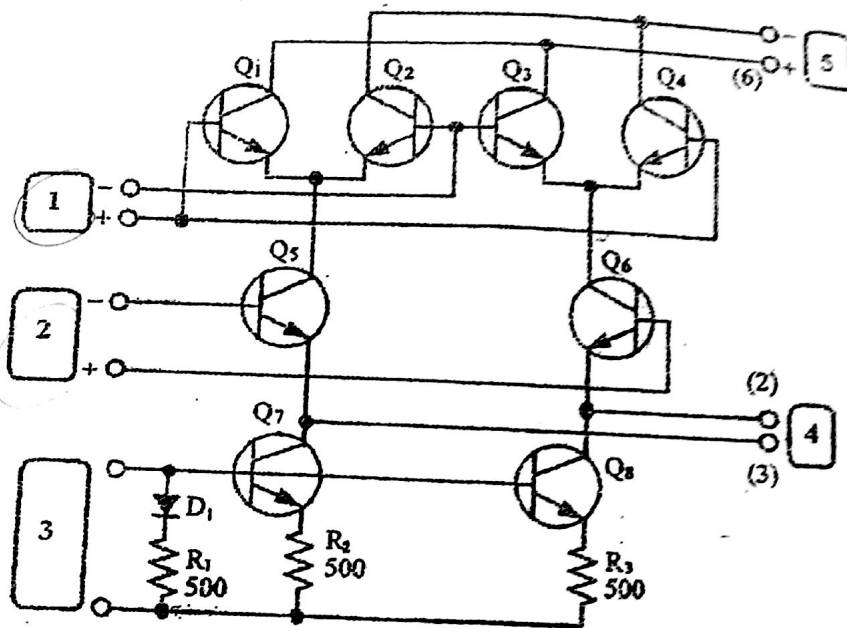


Figure (2)

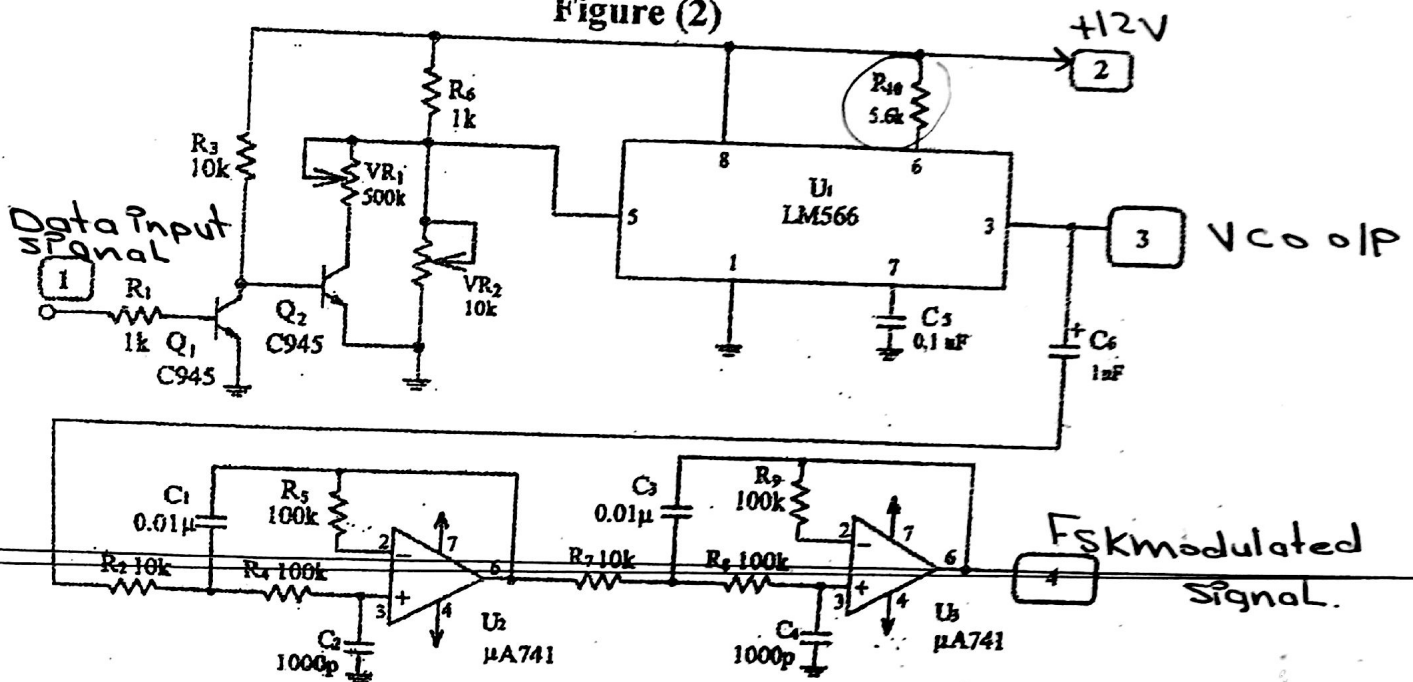


Figure (3)

Q4: (10 Marks).

Explain with drawing the following items:

- (1)- The block diagram of the synchronous **FSK** demodulator circuit. (2 Marks).
- (2)- The block diagram of the phase locked loop circuit. (2 Marks).
- (3)- The basic structure diagram of the **PSK** modulator technique. (2 Marks).
- (4)- A simple circuit diagram of **PSK** modulator. (2 Marks).
- (5)- The block diagram of the **PSK** demodulator. (2 Marks).

*With My Best Wishes
Dr. Muhammad Morsy*